Response to Arguments

Examiner rejected claims 13-18 and 35-39 under 35 U.S.C. 112 due to failing to comply with the enablement requirements. Regarding claims 13,14,35 and 36, the specification does not appear to teach the incorporation of a protruding peak structure within the claimed apparatus.

Specification changes are made as proposed in the specification amendments to care of this issue.

Examiner mentions regarding claims 15 and 37, the specification does not appear to mention the incorporation of a collar structure.

The word "lip" was used in the previous specification, which is changed to "collar" in the above specification amendments to take care of this issue.

Claims 1-8, 21, 22 and 24-27, 29, 30 and 42-46 are rejected under 35 U.S.C. 102(b) as being anticipated by Demers (U.S. Pat No. 5,879,632 A). It is claimed that the design is structurally no different from the prior art.

In order to further distinguish the structure from the prior art, additional feature of a protrusion on the second surface is included as part of the independent claims. This feature allows the interpenetration of the fluid meniscus of the first substrate into the fluid meniscus of the second substrate (Paragraph 0032). In Demers patent, the structure is such that a single meniscus or no meniscus is used and the structure cannot be used to intermix two meniscus in which case the interpenetrating protrusion

structural feature is essential. This feature is not obvious since the unrecognized problem of making two meniscus to come in contact that otherwise would not if the surfaces are flat without a protrusion. This unexpected result allows combining of fluids in arrays. The air gap formed in Demers Patent by the apportionment chamber (1405 A) between the first and second substrates does not allow intermixing of meniscus and is not the appropriate feature.

The description of this feature is included in the specification paragraphs [0030] and [0031] as described by the specification amendments.

Claims 9, 19, 20, 28, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Demers in view of Jedrzejewski et al.

The additional structural feature inclusion presented above combined with the incorporation of the hydrophobic upper and lower surfaces, constitutes a novel and non obvious invention over the prior art. Additionally, the protrusion, 18 in Fig. 1 and 1 A is in fluid communication with a through-hole 20. This feature is non obvious where the through-hole and the protrusion are connected to each other. A simple protrusion without the thorough-hole will not allow mixing of two meniscus as well as suspension of the meniscus in the through-hole. This feature is novel over the prior art.

Fisher et al. (US Patent 6,689,323 B2) disclose a structure in Fig. 1C to move the meniscus, 102 using a movable pin, 108 which requires tight guides, 16 for motion which is structurally different from non moving meniscus in the current application.

Bass (US Patent 6,399,396 B1) discloses in Fig. 1C a structure suitable for compressed loading of fluid from one substrate to another. In this case, the fluid, 13 is pushed out first rather than immersing the protruding tip inside as in the current invention. Karg et al. disclose an integrated metering tap with various moving parts for microvolume liquid dispensing. The structural features are significantly different such as moving piston, spring, piston guides etc. Bjornson et al. (US Patent 6,103,199 and 6,284,113 B1) disclose a capillary electroflow apparatus. This apparatus consists of in Fig. 3 an array of sample receiving elements, 102 on a first plate, 100 and an array of microfluidic networks on another plate, 110. The structural features are not designed for two meniscus mixing, and require sealing between the two plates as shown in Fig. 8, which is not the feature proposed in the current application. Pfost et al. (US Patent 6,485,690 B1) show use of stacking of multiple plates with microchannel features for building of fluid processors. No protrusion structural features were addressed, no meniscus mixing were discussed as shown in Fig. 6 - 46. Features to move fluids in a valve configuration are discussed where moving fluid in one direction vs. another is important for fluid logic based applications. Dubrow et al. discuss a device that consists of plurality of ports connected to fluid channel network. The structural features require substantially planar surfaces without protrusions and tight seal between the two plates is necessary to drive the fluid from top plate to the bottom plate or vice versa. The structural features 106 and 114 of Fig. 1 are different from the current invention.

Conclusion

The prior art does not contain structural features to enable mixing of meniscus that are freely suspended in through-holes.

The current application proposes such new structural elements and functional features, which allows new commercial applications.

The applicant respectfully requests to discuss the application over the phone to resolve the issues, which the Examiner expressed interest in during earlier communication. Alex Freeman cell phone number is 214-868-9101 and can be reached most of the time.

Conditional Request For Constructive Assistance

Applicant has amended the specification and claims of this application so that they are proper, definite, and define novel structure which is also unobvious. If, for any reason this application is not believed to be in full condition for allowance, applicant respectfully request the constructive assistance and suggestions of the Examiner pursuant to M.P.E.P 2173.02 and 707.07(j) in order that the undersigned can place this application in allowable condition as soon as possible and without the need for further proceedings.

Very respectfully,

Alex Freeman

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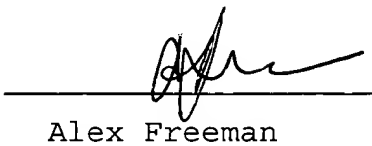
2004 December 30,2004 

Alex Freeman